Microcomputer Newsletter

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The Fine Print:
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News and Announcements

The IBM Convertible

IBM announced the IBM PC Convertible on April 2. A brief description of the Convertible and other IBM product announcements follow. If you are interested in more detail, stop by the Micro HelpLine, and you can read the official product announcements or talk to a consultant.

Convertible Hardware

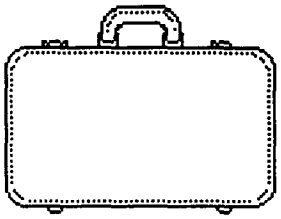
The PC Convertible is a true portable; it weighs only 12.2 pounds and can run off its battery pack for 6 to 10 hours between recharges. The Convertible comes with 256K memory, and you can expand the memory in 128K increments to a maximum of 512K. You can buy an internal 300/1200 baud modem. An optional serial/parallel interface is available, as well as a 40 character-per-second dot matrix printer. Both the serial/parallel interface and the printer are compact units that fit onto the back of the Convertible. The internal modem fits *inside* the Convertible.

The Convertible's screen is a 25-line liquid crystal display (LCD). Opinions of the LCD's readability among Micro Group staff are varied; some of us like the display better than the Zenith 171's LCD display, others like the Convertible's LCD less. Everyone agrees that the LCDs are not as readable as a CRT display, but the virtues of LCDs (small, light, and low power consumption) make them popular for portable microcomputers. IBM offers an optional Convertible display adapter and monochrome and color CRT displays that you can use when you aren't transporting the Convertible. The display adapter that you connect to the Convertible produces a composite video signal, so the IBM monochrome (TTL signal) display will not work with the Convertible. The CRT designed for the Convertible produces a reasonably sharp image, however.

The Convertible comes with two 3.5" disk drives. (You cannot read 3.5" Macintosh disks initialized on the Convertible—or vice versa.) The Convertible 3.5" disks are double-sided and hold 720K. 720K is quite respectable compared to the 360K capacity of IBM 5.25" disks. The short-term drawback to the 3.5" disks is that nearly all IBM software is available only on 5.25" diskettes. If a large number of Convertibles are sold, we expect software vendors to sell their programs on 3.5" disks. IBM's strategy for dealing with this compatibility problem is to make a 3.5" external disk drive available for IBM PC owners. You can use a PC equipped with the external 3.5" drive to

———————————*News Continued on Page 6*

REVIEW: Apollo Domain Workstations



The concept of a personal computer workstation was developed at Xerox's Palo Alto Research Center (PARC) quite some time ago. The idea was to create a personal computer environment that would be powerful enough to handle most engineering and software development applications. The development process led to ideas that enhance the user's productivity—including object oriented programming, windows, a mouse (or some other pointing device), icons, pop-up menus. All these ideas were incorporated as part of a minicomputer with a large graphics-capable screen. Sound like a big Macintosh? Well, yes. Apple scaled the idea down to fit it into a $2,000 microcomputer. Other companies have gone in a different direction and built full-blown implementations of such workstations. Now that the price of hardware is down, we are beginning to see a proliferation of workstations in industry and university environments. The Apollo Domain computers are such workstations. We've had two Domains to evaluate in the HelpLine and have been favorably impressed.

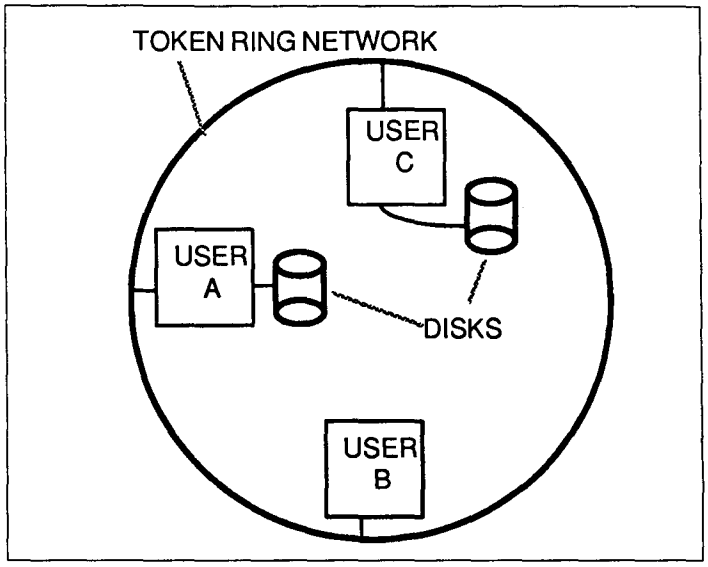
Hardware Features

The two workstations we had for evaluation belong to a line of workstations that include about six different models. The heart of every Apollo Domain workstation is a Central Processor Unit (CPU). Apollo uses the Motorola 68010 microprocessor in their low-end machines, the Motorola 68020 microprocessor in their mid-range machines, and a 32-bit, bit-slice CPU in their high-end machines. Memory varies from 1-3 MByte on the low end to 4-16 MByte on the high-end. Mid-range and high-end machines support color graphics. Black and white and color screens provide high-resolution bit-mapped graphics with resolution up to 1024 by 1024. Hard disk drives and fixed storage drives come in sizes from 63 MByte to about 2,000 MByte. All models can have an optional mouse and touch pad.

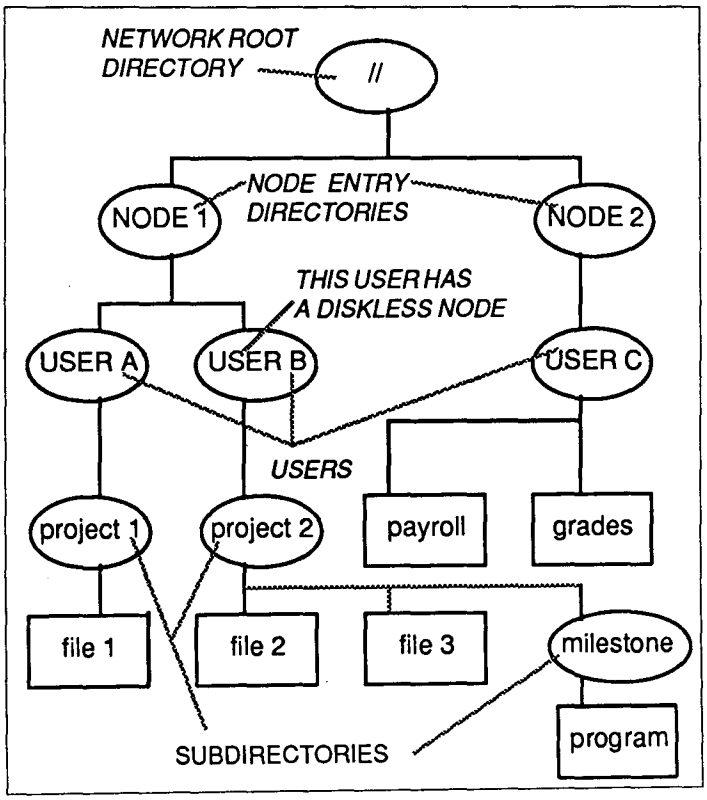
Apollo workstations can operate as stand-alone units or be connected to a network of Apollo computers. Unlike most machines, the Apollo Domain workstations were designed around the idea of a high-speed wide-area network and resource sharing. The idea of resource sharing and networking Apollo computers is a basic part of the Domain's architecture and is built into the operating system. Thus, Apollo's naming convention for files and processes is designed to handle a distributed file system. Quite often the files you access at your workstation actually reside on a hard disk connected to another workstation. A wide variety of devices can be connected to the network, including file servers, compute servers, and tape drives. Printer support includes laser, letter quality, and dot-matrix printers.

Software

All the Apollo hardware features are neatly tied together by AEGIS—the Apollo Domain proprietary operating system. AEGIS is well suited for the needs of a single (isolated) user as well as for a network of users. The file access mechanism is network-transparent and does not depend on the network configuration. A common file and process naming scheme spans the network. This scheme uses a UNIX-like directory structure with network nodes positioned one level below the global root. Each network's node directory is, again, just a UNIX-like tree structure. Any user can access any file (subject to access rights limitations) on the network regardless of the files' (or programs') physical locations. Physically, a network of Apollo Domain workstations might look something like this:



To the users in the network pictured above, the logical arrangement of the file system is a hierarchy. In the hierarchical diagram below, nodes 1 and 2 are workstations with disks. User A is using node (workstation) 1; user B is using a diskless node



(workstation); and user C is using node (workstation) 2. Files which belong to the diskless node (user B) physically reside on node 1.

The data transfer rate across the network is 12 MBytes/second; this is comparable to the data transfer rate of a hard disk drive. This speed makes it possible to utilize storage on different hard disk drives without significantly degrading the program's performance. Demand-paged virtual memory is another time-saver: pages are transferred to the main memory only when data on them is needed. The presence of several processors on the network lets a user share not only disks but also computational resources (stealing CPU cycles) as well. This capability requires some form of communications among processes.

AEGIS supports several forms of Interprocess Communications (IPC). The mechanism for IPC is based on message passing. Message passing is supported on the hardware level as well as the software level. Application programs can create their own messages and send them using one of a large variety of system calls and procedures, whichever one is most suitable for a task at hand.

AEGIS Display Manager (DM) allows users to create and maintain windows. Processes can use windows to execute standard I/O operations using the screen/keyboard combination. Windows can be used to create and edit text files, as well as to draw graphical images on the screen. Several independent applications can run at the same time on a workstation; each application uses its own window to communicate with the user. Each window can be reshaped, brought to the "top" of a pile of windows, moved, destroyed, etc. Programs can manipulate windows through calls to the DM.

AEGIS also supports shell programming. This is done much in the same way UNIX shells are programmed. Berkeley 4.2 and System V Release 2 versions of UNIX are also available on the system. You can use Berkeley 4.2 UNIX in one window, AEGIS in another window, and UNIX version V in a third window. Users who know UNIX can start using Domain workstations immediately by working in the environment they are more familiar with. Whichever shell has been chosen by the user, a variety of high level languages is available, including Pascal, C, LISP, and FORTRAN. All of the languages allow easy access to more than 100 system calls as well as to the DM calls. All languages generate common code, and modules created using different compilers can be easily linked together. Common libraries of routines are also available.

Documentation

The documentation that comes with the Domain is proof that it is possible to write good, consistent, and clear manuals. Unlike most traditional manuals, Apollo's manuals include extensive explanations and examples that work the first time around. The examples even conform to what the manual says! In the manuals, an introduction is given to each subsystem or tool, and its connections to other systems are explained in simple terms. A do-as-I-do approach lets the user start using a workstation immediately.

Ease of use

We found a nice way to start to use the Apollo Domain workstations is to open an Introduction and follow it as one sits in front of a machine (sipping a Coke or Pepsi). Then read through the Users Guide in the same way. The examples mentioned in the manuals are available on-line, and the examples work as advertised! Getting confused or lost in the system is not dangerous, since a button clearly marked HELP is available to the confused user. If you press the button, the system brings up a window explaining how to use the help feature and what to do next.

Several other special keys are laid out in front of the user on the keyboard. It is possible to start a new process, to edit or create a file, to copy, cut, paste, undo the editing command, abort a process, get help, move a cursor all over the screen, scroll the window, move a window or reshape it, etc. by pressing one or two of the specially marked keys on the keyboard.

Any of the regular keyboard keys or any of the specially marked ones can be remapped (redefined) into almost anything you desire. Users familiar with the Macintosh will find that though the mouse does not work the way they anticipated, it is still a very useful device (even when one gets confused among its three buttons).

Set-up

The machine we evaluated was set up by the sales representative in a couple of minutes. Unlike many UNIX-based machines, loss of power, disconnecting a keyboard during operations, or hitting the hardware reset button in the middle of program execution does not seem to have any significant negative effect on the system. True, the system had to salvage a disk a couple of times after we accidentally disconnected the power; but no wizardry, except for reconnecting the power, was required to bring the system back to life.

Connecting and disconnecting nodes to and from the network was as easy as connecting an antenna to a cable TV set. Network nodes can be as far as 1 km apart.

Conclusions

The Domain system is a wide-area network-based distributed system architecture line of workstations. The Domain supports economical use of rather expensive computers by means of sharing storage and computational resources among the users on the network. The system supports uniform network-transparent access to each subsystem by all participants. A large number of processes can be run simultaneously by each user at any workstation on the network. Application languages such as Pascal, C, LISP, FORTRAN, and Berkeley 4.2 and System V Release 2 UNIX are supported. Bit-mapped high resolution graphics, a mouse or a touch pad, and excellent manuals are all designed to enhance your productivity and efficiency.

The Apollo Domain machines are certainly worth considering if you are in the market for high-end workstations for applications such as program development or computer-aided-design.

TUTORIAL: IBM and Macintosh Subdirectories

Judging by the questions we receive on the HelpLine, many people have misconceptions about subdirectories and how they are used. This tutorial covers subdirectories on the IBM PC (and compatibles), and folders (that now act as subdirectories) on the Apple Macintosh.

What is a Subdirectory?

With the introduction of hard disks and higher capacity floppy disks, the number of files that can be stored on a disk has increased dramatically. Greater storage capacity is certainly an improvement; but, because the disks hold a larger number of files, it can take a long time to find one file out of a list of hundreds. The solution is to organize the disk by breaking up the main directory of files into smaller directories (called *subdirectories*). Each subdirectory can contain groups of related files—for example, a program and all data files associated with that program. With subdirectories you can organize your disk by having one subdirectory for your spreadsheet program and all its worksheets, another subdirectory for your word processor and all its documents, and so on.

An easy way to understand the concept of subdirectories is to think about them in terms of a file cabinet. Picture a file cabinet with two drawers. One drawer contains all information from A to M and the other drawer contains all information from N to Z. Within each drawer are envelopes containing information on various subjects. For example, in the second drawer under the letter *T* is an envelope for *Taxes*. By using a file cabinet we can organize information so that it is fast and easy to locate.

The main directory of a disk (also called the root directory) is analogous to the file cabinet as a whole. When you start up your microcomputer you enter the main (root) directory. The main directory contains subdirectories just as the file cabinet contains drawers. In the same way that we organized our *Taxes* envelope in the second drawer of the file cabinet, we can place subdirectories inside of other subdirectories. Suppose we have several years of tax records to store. Within the *Taxes* envelope we can have an envelope for 1983's taxes, an envelope for 1984, and so on. It would take you a long time to find 1983's tax forms if you had to look through an unorganized heap of paper. For similar reasons you may have a hard time locating one file out of a group of hundreds if you don't organize the contents of your disks with subdirectories. Grouping related files together into a subdirectory makes it easier for you to locate a file. Once you understand what subdirectories are used for, you still must learn the commands to create, destroy, and manipulate them.

Next we look at the specifics of how subdirectories are implemented on the Macintosh and the IBM-PC.

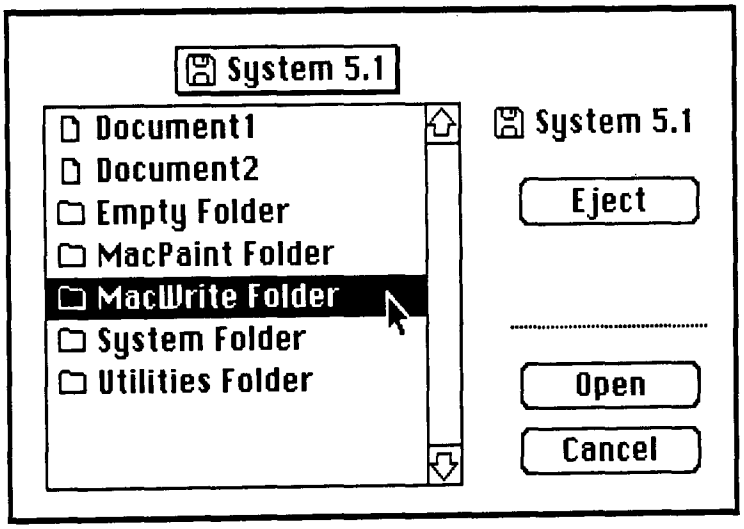
Macintosh

On the Macintosh, the version of the Finder you are using determines if your disks have subdirectories. Finder version 5.0 or greater uses the Hierarchical File System (HFS) on double-sided (800K) disks and hard disks. Single-sided (400K) disks and pre-5.0 versions of the Finder use the Macintosh File System (MFS). Both HFS and MFS make use of folders for arranging documents; but on MFS, folders are strictly a cosmetic effect. MFS folders make a window less cluttered but do not restrict access to documents within a folder.

With HFS the folders are true subdirectories. HFS folders (subdirectories) limit the number of files a program must look through to find documents (files). Most programs will look only in the immediate folder. This results in substantially better performance as the capacity of disks increase, and HFS will make it easier for you to locate documents when you need them. What this means to you is that your documents should be grouped in a logical fashion. For example, you might place all of your MacPaint documents into one folder and name it *MacPaint Folder*. When you use MacPaint you would open *MacPaint Folder* from within MacPaint, and then open the specific MacPaint document. This may sound unfamiliar, but changes to the *Open* and *Save* dialogs allow you to take advantage of HFS with relative ease. These changes are discussed below.

Create/Change/Destroy Mac Subdirectories

You can create a new subdirectory very easily. Simply choose the *New Folder* option from the *File* menu. *New Folder* creates an empty folder (subdirectory) into which you can move your files (documents). You can also easily move files in and out of subdirectories: simply drag the file into the folder to put it in a subdirectory. Once you have placed your files in the folder, you can open up the folder (subdirectory) by double-clicking on the folder icon. This changes the current working (default) directory to the folder that you just opened. The current working directory is where programs will save and look for documents. To remove a subdirectory, you can drag the entire folder to the trash can. *This will remove the subdirectory and its contents (all documents that are in it).*

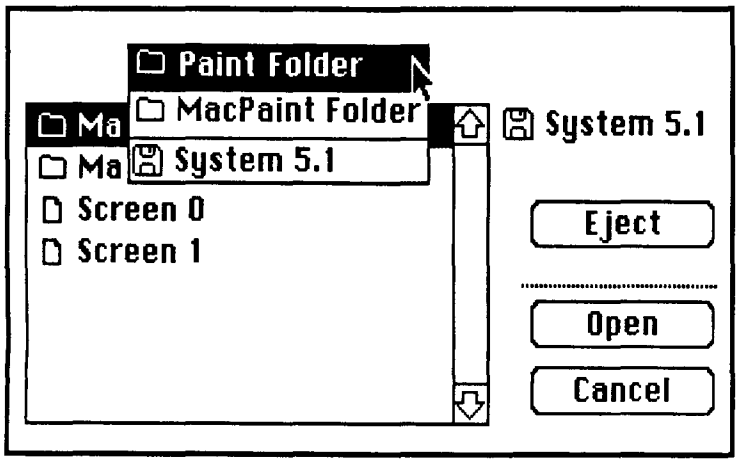


Open Documents

When you select the *Open* option from the *File* menu from within an application, you are presented with the dialog shown on the left.

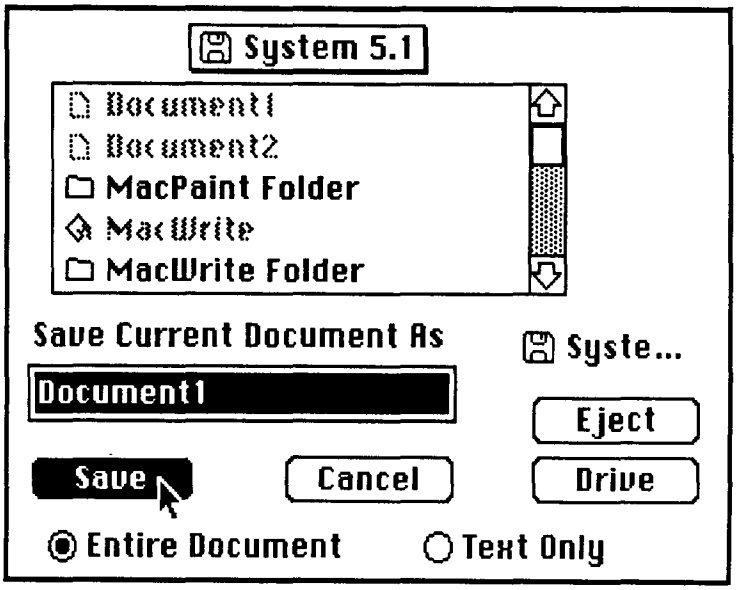
The working directory is displayed above the list of files and folders. In the dialog box shown *on page 4*, the working directory is a disk (as indicated by the disk icon next to the working directory name *System 5.1).* Listed below the disk icon are the names of the folders or documents that are contained within the working directory. If the document you want is not shown in the working directory, you can double-click on another folder to get to the documents within that folder. The folder you select becomes the new working directory, and the contents of that folder will be displayed in the list.

Since it is possible to have folders within folders, you might need to see where you are in the nested folders. You can place the pointer on the working directory name and hold the mouse button down to see a path from the current working directory to the disk. To move up to a previous folder, you drag the mouse down to select the folder. Once you've selected the folder, when you release the button the current working directory will be the folder you selected.



Saving Mac Documents

The *Save* dialog has been changed in a fashion similar to the *Open* dialog. When you save a file, you will see a dialog box similar to the one shown below:



Note that the working directory is displayed at the top of the dialog box along with a list of folders and documents that are in that directory. If you select *Save* at this point, *Document 1* will be saved in the *System 5.1* disk (the working directory). If you want to save the document in a folder that is not the working directory, you must make that folder the current working directory. You do this by double-clicking on the folder in the list. (You will note that all of the documents in the list are greyed-out. You wouldn't want to save a document into another document, so your selection is limited to only the folders.)

IBM-PC

If you are using PC-DOS version 2.0 or higher, you can also use subdirectories to organize your files. *In the examples below, commands that you type are in* **BOLDFACE.** *DOS Prompts and information displayed by the IBM-PC are displayed in* PLAIN *type.*

Creating IBM Subdirectories

To create a DOS subdirectory you use the MKDIR or MD (Make Directory) command. For example, if you wanted a subdirectory called WSTAR to hold the WordStar program and documents, you would enter the following command:

```
C> MD WSTAR
```

This command creates a new subdirectory named *WSTAR*. When you create a new subdirectory, there are two files that are automatically placed inside the subdirectory. One is '.' which refers to the directory itself and the other is '..' which refers to the parent directory.

If you typed DIR, you would see the new subdirectory listed in the directory as:

```
C> DIR
WSTAR          <DIR>
```

Changing IBM Subdirectories

As in the file cabinet, you frequently need to look in a different drawer or envelope to find a particular document. To enter (access) a subdirectory, you use CHDIR or CD (Change Directory). To make the WSTAR subdirectory the current directory, you would type:

```
C> CD WSTAR
```

The directory that you are currently in is referred to as the default directory. The default directory is where your programs (such as WordStar) will look for and save documents; it is your working directory. Because your default directory is now the *WSTAR* subdirectory, you can copy the WordStar application from the floppy drive directly into the hard disk WSTAR subdirectory.

As you create documents, you may want to group them together in a logical fashion. For instance, if there are several people using WordStar, each may want their own subdirectory to keep their WordStar documents. You can do this by using the *MKDIR*

command again. You now have a subdirectory within a subdirectory. To change back to the parent directory, you enter.

```
C> CD ..
```

Going back to the file cabinet example, if you were working on a document for the 1984 tax year, you would know that the document came out of the 1984 tax envelope that was part of the *Taxes* envelope that was located in the second drawer. Since this relates to having subdirectories within subdirectories on your disk, it is sometimes necessary to see where your current directory is in relation to the main directory. *CHDIR* or *CD* without any parameters will display a path from the current working directory back to the main (root) directory and will show the name of each subdirectory along that path. The example below shows the path from your subdirectory within the *WSTAR* subdirectory, to the *WSTAR* subdirectory, and back to the main directory at *C:*.

```
C> CD
C:\WSTAR\YOURNAME
```

Remove IBM Subdirectory

There will be times when you want to remove directories from a disk. To do this, the IBM subdirectory must be empty. You may either copy the files to another location and then erase them from the current directory, or you can erase them immediately. The '.' and '..' files will still appear in the subdirectory even after you issue the erase command. The command to remove the subdirectory (and the "." and ".." files) is *RMDIR* or *RD*. You cannot remove either the root directory or the current working directory. To remove the *WSTAR* subdirectory, you would first move to the *WSTAR* subdirectory and erase all files (if there are subdirectories within *WSTAR* you must also remove them). Then, you move up to the parent directory (by typing `CD ..`) to make it the current working directory. Finally, you remove the *WSTAR* subdirectory by typing the following command:

```
C> RD WSTAR
```

To open a file that is in a subdirectory other than the working directory, you must include the subdirectory name along with the drive and file name. You must use the \ delimiter (separator) between the names. For example, if you wanted to open a file named *MYFILE.DOC* that was located in the *WSTAR* subdirectory on drive *C*, you would enter the following:

```
C:\WSTAR\MYFILE.DOC
```

By specifying the disk drive (C: in our example) and subdirectory (*WSTAR*) where the file is located, you give the system the file's exact location; its exact name. Unfortunately, some programs are unable to find files even when you give the program the file's exact location.

Subdirectory Problems

Subdirectories have a price. The most common problem people encounter (after their initial confusion about how to manipulate subdirectories) is with running programs from within subdirectories. Programs that were developed before subdirectories were implemented (before IBM's DOS 2.0 or the Mac's HFS) sometimes have problems when they are installed on a system using subdirectories. These problems include the inability to open files that are not in the same subdirectory as the program, inability to find help files, and the worst case: programs that do not run at all.

If you encounter difficulties with a program, there are several things you can try. First, move the program and all its associated files into the same subdirectory. If that doesn't work, move the program and all its files to the root directory. If you still can't get the program to function, you may want to call the people who wrote the program. In many cases they have a new version of their software that does work from within subdirectories.

Conclusion

The trend in microcomputers is toward disk storage media with higher storage capacity. Inexpensive microcomputers now allow you to store more files than you can conveniently handle unless you use subdirectories to organize the disk. But, beware—some programs in their current versions may not work properly if placed in a subdirectory or folder. Many of these problems are transitory in nature: new versions of the offending software solve the problem.

News Continued from Page 1 ——————————

transfer *non-copy-protected programs* from 5.25" diskettes to 3.5" diskettes. Copy-protected software is another story. Most copy-protection schemes depend heavily on the exact format and organization of the diskette; these schemes may prevent you from moving software onto 3.5" diskettes.

The Convertible's keyboard can produce all the key codes of an IBM-PC or AT keyboard. However, because of space constraints, the Convertible's keyboard arrangement is a little different from the traditional PC keyboard. The Convertible's 10 function keys have been moved from the left of the main keyboard to above the main keyboard. A drawback to this arrangement is that templates that fit over the 10 function keys on an IBM-PC won't fit on the Convertible's keyboard. (We predict a brisk business in new templates for Lotus 1-2-3 and WordPerfect users.)

IBM Convertible Software

The Convertible comes with PC-DOS version 3.2 which supports the 3.5" disk drive. If you plan to use the 3.5" external disk drive with a PC, XT, or AT you also must purchase PC-DOS 3.2.

In addition to PC-DOS, the Convertible comes with a shell (the Application Selector) and several programs collectively called SystemApps. The Applications Selector shell generally insulates you from the PC-DOS operating system. That is, you can run programs, copy and delete files, and so on, without typing PC-DOS commands. Instead, you choose the action you want to perform from a menu on the screen. You make a menu selection by pressing one of the function keys.

SystemApps consists of several programs: Notewriter, Schedule, Phone List, and Calculator. Notewriter is a simple word processing program that is adequate for tasks such as taking notes and writing short memos. You probably would not want to write a term paper with Notewriter. The Schedule, Phone List, and Calculator programs do just what their names imply.

IBM Convertible Costs
The IBM PC Convertible is available at the Book Center for $1800. This configuration includes the Convertible with 512K memory, the serial/parallel adapter, PC-DOS 3.2, and the SystemApps and Application Selector software.

•IBM-XT

When IBM announced the PC-Convertible, they also announced an IBM-XT retail price cut. Other changes in the IBM-XT concern disk drives, memory, and the keyboard.

The XT is now available with a 20 MByte hard disk drive (formerly, the only hard disk drive available with the XT was a 10 MByte). The 5.25" floppy disk drives are now *half-height* drives; this means you can fit two floppy drives into the space that was formerly occupied by one drive. An internal half-height 3.5" diskette drive is also available for the new XT models.

The XT's main circuit board has been redesigned so that it can hold up to 640K. Formerly, the XT's main circuit board could only hold 256K, which meant you had to buy a memory expansion card to install 640K memory. With the new XT, you can upgrade the machine's memory by plugging in memory chips on the main circuit board.

Enhanced Keyboard
IBM also announced an enhanced keyboard for the new XT and AT. Changes in the keyboard include:
- two new function keys (F11 and F12)
- all function keys are now across the top of the keyboard rather than along the left side
- the arrow keys are not part of the numeric keypad
- the arrow keys are now located between the main keypad and the numeric keypad
- the main keypad layout is now very similar to an IBM Selectric typewriter keyboard

According to our local IBM representatives, you *cannot use the enhanced keyboard with existing IBM equipment* because the ROM BIOS in older machines does not support the new keyboard. There is apparently *no keyboard upgrade path* for existing machines.

IBM-XT Configurations
There are four IBM-XT configurations available through the Microcomputer Discount Program. They are:

1—IBM-XT: two half-height 5.25" disk drives, 512K memory, serial interface, enhanced keyboard, PC-DOS 3.2: $1630.

2—IBM-XT: Configuration 1, plus monochrome display adapter (with parallel interface), monochrome (TTL signal) display, PC-DOS 3.2: $1975.

4—IBM-XT: one half-height 5.25" disk drive, one 20 MByte hard disk drive, 512K memory, serial interface, enhanced keyboard, PC-DOS 3.2: $1900.

3—IBM-XT: Configuration 3, plus monochrome display adapter (with parallel interface), monochrome (TTL signal) display, PC-DOS 3.2: $2245.

•IBM-AT

IBM also announced retail price reductions for the IBM-AT and changed the AT a little. The AT changes include higher speed and the enhanced keyboard. Here are the details: The original AT's 80286 Central Processing Unit (CPU) ran at a clock speed of 6 MHz. In the new AT, the clock speed has been increased to 8 MHz. Increasing the clock speed should result in about a 33% increase in performance for CPU-intensive tasks on the AT. The new AT keyboard is the same as the enhanced keyboard for the XT. We asked the local IBM representatives if there is any upgrade path for owners of old ATs — *the answer was no.*

There are two IBM-AT configurations available through the Micro Discount Program. They are:

1—IBM-AT: one 1.2 MByte capacity 5.25" disk floppy drive, one 360K capacity floppy disk drive, one 30 MByte hard disk drive, 512K memory, 8 MHz 80286 CPU, serial interface, enhanced keyboard, PC-DOS 3.2: $3920.

2—IBM-AT: Configuration 1, plus monochrome display adapter (with parallel interface), monochrome (TTL signal) display, PC-DOS 3.2: $4280.

•Enhanced 512K Macintosh

On April 14, Apple announced an enhanced version of the 512K Macintosh. The Enhanced Mac differs from the original 512K Macintosh in two respects. First, the enhanced model has a double-sided 800K internal disk drive. Second, the Enhanced 512K Mac has the new ROMs; these are the same ROMs that are in the Mac Plus. Improvements in performance due to these changes include:

- twice as much storage capacity in the new internal disk drive (800K vs. the old 400K drive)
- faster disk access
- faster screen redrawing due to improvements in the new ROMs

If you already own a 512K Macintosh, you can upgrade your Mac to the enhanced version by purchasing the Mac Plus disk drive upgrade. This upgrade consists of the new ROMs and an 800K internal disk drive. We understand that customers who purchased a 512K Macintosh between January 16, 1986 and April 14, 1986 *might be eligible* for a price break on Mac Plus disk drive upgrades. This promotion will run through July 15, 1986. Unfortunately (as of press time) we do not have all the details of how the rebate will work at the University. We hope to have more information by the time you read this. Call the Micro HelpLine, or see the June issue of the Microcomputer Newsletter for further rebate information.

You should be able to buy an Enhanced 512K Mac by the time you read this (assuming Apple ships the Enhanced Mac in late April as promised). *The University Discount Price for the Enhanced 512K Mac with MacWrite and MacPaint software is $1160.*

•Free Mac Carrying Case

All Macs ordered *between April 15 and May 30* will come with a free carrying case. Although the Mac Plus keyboard is longer than the 512K keyboard, this longer keyboard will fit into the carrying case; but you have to be very careful about how you zip the case closed.

•Lisa Upgrade

Apple has announced a migration path for Lisa owners. *For $1580 you can trade in any Lisa and get a Mac Plus and Apple's 20 MByte hard disk drive.* You also can move your documents from the Lisa to the Mac Plus. The Micro Group has the Lisa migration software which makes it possible to move documents created with LisaCalc, LisaDraw, LisaGraph, LisaList, LisaProject, and LisaWrite onto the Macintosh. Once your documents are on the Mac, this software converts them to a format usable by equivalent Mac programs (including Excel, MacWrite, MS Word, MacProject, MacDraw, MultiPlan, and Jazz).

We very strongly recommend that Lisa owners take advantage of this opportunity to migrate to the Macintosh. For most operations, you will find that the Mac Plus out-performs the Lisa by a considerable margin. More importantly, the Macintosh has a vigorous software market; this means you have a wide variety of new software from which to choose. Another reason to migrate is that *the Microcomputer HelpLine is dropping support for Lisa software. We no longer have any Lisa software running, so it is impossible for us to assist you with programs such as LisaWrite and LisaCalc.* We hope that all Lisa owners will take advantage of this chance to move into the mainstream of Macintosh software. *The Lisa trade-in offer expires August 31, 1986. If you are a Lisa owner considering this trade-in, please call or visit the Microcomputer HelpLine for more details.*

•IBM BASIC Compiler UPDATE

We have finally received a copy of the November 11, 1985 update for IBM's BASIC compiler version 2.0. This update fixes the following problems:

1. Active/Visual pages not scrolling properly.
2. System hangs on the CHAIN statement if all files are not closed.
3. Elements of DYNAMIC arrays give arithmetic errors.
4. CHR$(10) not sending line feed when following CHR$(13).
5. Implied GET gives "bad record number" error message.
6. CHR$(27) not working properly when sent to printer.
7. DIM statement with SHELL hangs system.
8. $ parameter of the CLEAR statement not funtioning.
9. "Permission denied" error given instead of "disk full" error message.
10. PRINT # when: is left off of "LPTn" causes double spacing.
11. If an assembly language program turns off speaker, it remains off for PLAY statements.
12. OPENing and KILLing over 20 files in sequence generates a "String formula too complex" error.

The IBM BASIC Compiler update is available at the Microcomputer HelpLine to individuals who *bring in their master disk. If you do not want the update placed on your master disk, bring in a blank disk in addition to the master disk.*

Please Note: This update is for the BASIC *Compiler only*, not the BASIC interpreter. The BASIC *Compiler is not* bundled with the PC-DOS operating system. You must buy the BASIC Compiler separately. Please look at your disks to make certain that you have the BASIC Compiler rather than the Interpreter.

REVIEW: WordPerfect 4.1 Upgrade

WordPerfect is a full-featured word processing package. We reviewed Version 4.0 in the July 1985 issue of our newsletter. In the Fall of 1985 Satellite Systems Inc (SSI) upgraded WordPerfect to Version 4.1 and this review covers the new version.

Registered owners of WordPerfect (WP) can upgrade to 4.1. If you purchased WP 4.0 on or after 9-1-85, the 4.1 upgrade is free. If you purchased WP 4.0 before 9-1-85, the upgrade to 4.1 costs $45. To get the upgrade, send your microcomputer's name, the cover page from your 4.0 manual, and check (if applicable) to: SSI Update Department, 323 North State Street, Orem, UT 84057. SSI will send you new diskettes, a new manual, installation booklet, quick reference, and template. Since SSI's 800 help line only answers questions on version 4.1, you should upgrade to continue to have free, expert help from SSI.

Overview

WordPerfect's basic features are virtually unchanged in Version 4.1. You can retrieve text, set margins, copy text and move it elsewhere, save a document, and exit with the same keystrokes as in 4.0. The WP manual and installation guide have been expanded; they contain more instructions and references. Whereas you needed 192K of RAM to use Version 4.0, you need 256K to use Version 4.1.

Basic Changes

You don't need a hard disk to work with larger files in Version 4.1. WP 4.1 uses all available memory (program addressable RAM memory) for editing space. When WP 4.1 runs out of RAM, it uses available diskette space. This means you can work on longer files if you expand your machine's RAM (640K of RAM is the DOS limit) or increase diskette space. Although Version 4.0 also used available diskette space when it ran out of RAM, it did not use RAM in excess of 192K.

WP improved its file management features. *List Files* now includes a *Copy* command. You can use the *Copy* command to copy a file to another disk drive or to another name. Hard disk owners can highlight the name of a directory and use the *Change Directory* command to move to that directory, or they can use *Change Directory* to create a new directory.

Although 4.0 automatically reformatted lines, paragraphs, and pages as you deleted text or added it, these spacing changes were not always reflected on the screen. You could use the 4.0 *Rewrite* command to see format changes on the screen. When you make changes with WP 4.1, WP automatically rewrites the document on your screen so that the changes fit into your margins, tabs, etc. format. (You can turn the auto-rewrite feature off if you want.)

Instead of centering one line at a time, 4.1 lets you mark a block of text (say four lines) and center all text in that block. You can also mark multiple characters for super- or-subscripting.

The dictionary/speller now immediately suggests alternate spellings when it finds a word it doesn't recognize. For example, as an alternative to *syllogesm* WP suggested *syllogism*; and WP suggested *crackerjack* for *crackejack*. You can still choose to add any word WordPerfect does not recognize to the dictionary.

Installation

WP's Installation Booklet contains information about DOS, Convert, WP system (program) files, and other information in addition to the features you can use while you are in WordPerfect. The Installation Booklet also includes more information on printer troubleshooting than the previous version.

We suggest you reselect/reinstall WP to work with your printer when you get 4.1. Although our old *WPFONT* and *WPRINTER* files worked with 4.1, since SSI has improved their support for many printers we used the new *WPRINTER.ALL* and *WPFONT.ALL* files to install each printer. The installation manual and on-screen menus step you through introducing WP to your printer.

Changes for Intermediate Users

If you use WP to create text columns, you'll like 4.1. Previously, you saw each column as a separate strip on the screen. In 4.0 each column was separated by dotted lines across the screen, and you had to look at the *Status Line* to confirm that you were editing column 2 or column 3. In 4.1 you can see columns 1-5 side-by-side on the screen.

If you need to execute DOS commands—for example to format a disk—you can use 4.1's *Go to DOS* feature. When you finish your business outside WordPerfect, you just type *Exit* and WP returns you to the exact spot you were at when you used the *Go to DOS* command.

WP is a *clean screen* word processor. It shows you (within the limits of IBM's text display) what your text will look like on a piece of paper. When you select most WP features, a code is inserted into your text. For example, this code could be a margin code. When you want to review or edit the codes you've embedded in your text file, you can use WP's *Reveal Codes* feature. When you use 4.1's *Reveal Codes* feature, the screen is split. The same section of your document is displayed in both halves of the screen. The top half of the screen displays a clean screen view; the bottom half of the screen displays the control codes. Because of the multitude of control codes that can be displayed, the bottom half of the screen looks like a mess to some people. Those of you who have learned to decypher WP's control codes can see (read) where every tab, carriage return, margin change, etc. will occur in the text. *Reveal Code* users will be pleased to know 4.1 lets them scroll forwards and backwards in this mode and use editing commands such as *delete word* and *move-cursor-one-word.*

Version 4.1 does windows. You can divide your working screen into two parts and use WP's *Switch* command to move from one document (part) to another document. If you write from notes (or instructions) you will like windows. You can have your notes in one window and the document you are creating in the other window. If you want to copy passages from your notes and retrieve (paste) those passages into the document you are creating, you can use WP's move commands.

SSI bundled their *Sort* program with WP 4.1. To invoke *Sort*, you hold down the Ctrl key while you press the F9 key. You can use *Sort* for simple tasks like alphabetizing a list of names. With *Sort* you can sort lines, paragraphs, or secondary merge files. The *Sort* instructions included with 4.1 are better than previous versions we have seen, but we still think the manual needs improvement. *Sort* is a powerful but complex program. Many users who have had no previous experience with data management features such as *Sort* would benefit from more instructions. We suggest you complete the *Sort* lesson to see how a successful sort works.

Thesaurus

We like Thesauri so much we bought one before WordPerfect added its own. We were disappointed in *Synonym Finder's* performance and cost (about $100). We are not disappointed with 4.1's Thesaurus. To invoke WordPerfect's Thesaurus, you move the cursor to the word for which you would like to find an alternative and hold down the Alt key while you press the F1 key. For example, as an alternative to *jeopardy*, 4.1 suggested *danger*, *hazard*, *menace*, *peril*, *risk*, and *threat*. Each alternative choice suggested by WP is assigned a letter. To substitute *danger* for *jeopardy* you would type *A;* to substitute *threat* you would type *F*.

File Conversion

SSI has expanded the kinds of file formats you can convert to and from WordPerfect format. The formats 4.1 can convert are: WordStar; MultiMate; 7-bit transfer (use this option to preserve WP codes for reconversion to WP format after documents have been transferred over a modem); Mail Merge; WordPerfect Secondary Merge; Spreadsheet DIF; Navy DIF; and Revisable-Form-Text (used by IBM mainframes).

You must exit WP or use the *Go to Dos* feature to use the *Convert* utility.

Problems

If you want to leave the WP program gracefully, you must quit WordPerfect by hitting the *Exit* key. This is fine, except that sometimes you are forced to stop using your microcomputer because of a power-failure or other natural disaster. If the power fails, you will quit WP without hitting the *Exit* key. *If you do not use the Exit key to stop using WordPerfect, the next time you start WP the message "Directory Is In Use" is displayed* and you will be asked to choose one of three options: 1 *Exit*; 2 *Use Another Directory*; 3 *Overwrite Files*. The answer (in the cases we just described) is *Overwrite Files*. You must give WordPerfect permission to overwrite the scratch (overflow) files it saved while you were using WP. When you exit 4.1 in a graceful manner (by hitting the *Exit* key), WP automatically deletes these scratch files.

We understand Hewlett-Packard LaserJet users who have WP Version 4.1 releases dated before 10/17/85 may have received bad LaserJet printer drivers. Your WP release date is displayed in the upper right corner of the Help screen. If you suspect you have faulty LaserJet drivers, contact SSI.

Conclusion

Like us, you may find it's worth $45 to you just to get WP's Thesaurus. (We've switched to 4.1 in the HelpLine.) SSI no longer makes Version 4.0; the Book Center only sells Version 4.1. To remain compatible with the largest number of WordPerfect users, we urge you to upgrade to Version 4.1. We won't abandon 4.0 users, but we don't expect to see many 4.0 users in our beginners classes either. Intermediate and advanced users have a lot to gain moving to 4.1, and our intermediate classes are taught using 4.1. Contact SSI Sales at 800/321-4566 if you have any questions about this upgrade procedure. Allow several weeks for delivery. Incidentally, the Book Center's current price for WordPerfect is $150.

One last note: We have placed WP's German Dictionary in the HelpLine for evaluation. If you have any ASCII or WP text files written in German, you're welcome to test this dictionary.

SCSI Drive for Mac Plus

The Book Center now carries the Mirror Technologies MagNet 20x hard disk drive for the Macintosh Plus. The MagNet 20x is a 20 MByte hard disk drive that connects to the SCSI interface on the Mac Plus. Physically, the unit consists of two pieces. The disk drive is about the size of the old Macintosh 400K external drive. The power supply is housed separately in another box that is also about the size of the old external drive. There is a four foot cable that connects the power supply to the drive. You would (typically) put the power supply on the floor (or someplace else off your desk), and place the disk drive next to your Macintosh.

The MagNet 20x comes pre-formatted, and already has InfoSphere's MacServe software installed. (Mirror Technologies bundles MacServe with each drive.) The MacServe software allows you to partition the hard disk into several independent logical volumes. The logical volumes are formatted as MFS disks rather than HFS disks. (See *Tutorial: IBM-PC and Macintosh Subdirectories in this issue of the newsletter* for an explanation of the difference between MFS and HFS.) Each of the logical volumes can be shared between any other Macs connected with the AppleTalk Local Area Network. Access to volumes can be limited through a password protection scheme. MacServe also performs print spooling to an Imagewriter (but not to the LaserWriter).

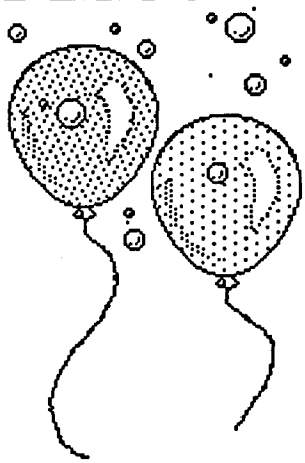
Note that while MacServe allows you to *share disks or volumes*, MacServe *is not a file server*. A file server allows multiple users to simultaneously access the same file. A disk server (such as MacServe) prevents simultaneous access to the same file by restricting write access to privately mounted volumes. This may seem like splitting hairs, but the difference between a disk server and a file server is crucial if you want a multi-user database.

If you don't plan to share volumes, you can reformat the hard disk and use it in the same fashion as Apple's 20 MByte hard drive: as a high-capacity HFS disk. Although the Mirror Technologies manual skirts the issue of how to format the disk for HFS, we were able to do so without much trouble.

Please note—We have only had the MagNet 20x for a week and a half, and so *we are withholding judgment* until we have more experience with the drive.

The Mirror MagNet 20x costs $835 at the Book Center. Incidentally, Mirror Technologies is a local company; they are based in Hugo, Minnesota.

Micro Fair—May 7 & 8



The IT Tech Fair will include a Microcomputer Fair on May 7 and 8 as a joint venture among IT Week, Plumb Bob, the Minnesota Book Center, and the Microcomputer Systems Group. The Microcomputer fair will be held on Northrup Mall and include exhibits from Apple, IBM, Zenith, AT&T and others.

In conjunction with the Micro Fair, a series of seminars will be held in Coffman Union.

For those interested in the Macintosh, seminars will include: Microsoft Excel and Word; Macintosh CAD/CAM (computer aided design and manufacturing) software; desktop publishing; and software development on the Macintosh.

Seminars for those interested in the IBM-PC include: the IBM PC-RT; networking; CAD/CAM (computer aided design and manufacturing) with the professional graphics display; and the IBM PC-Convertible.

If exhibits and seminars aren't enough hoopla for you, fear not. The Minnesota Book Center will offer several special packages during the fair. Check these prices:

—Enhanced 512K Macintosh, carrying case, Imagewriter I, MacWrite and MacPaint: $ 1375.
—5-pack of Sony 3.5" double-sided diskettes: $ 11.75.
—IBM-PC, 256K memory, monochrome display and display adapter (with parallel port), two 5.25" floppy disk drives, PC-DOS 2.1 (*note—this PC has no serial port*): $ 1300.
—10-pack of Sony 5.25" double-sided double-density diskettes with library case (the case holds 10 diskettes): $ 10.80.

Please note that there are limited quantities available for some of these products. Also, these prices are available *only at the Minnesota Book Center's booth in the tent on Northrup Mall on May 7th and 8th.*

Campus Mail Requirements

We deliver several thousand newsletters through campus mail every month. These newsletters (like any bulk mailing over 50 items) must be presorted. Campus Mail sorts all mail by department and requires that we sort our newsletter by department.

Campus Mail reserves the right to return newsletters to us with incorrect or incomplete addresses, *and they have returned several hundred such newsletters.* Complete addresses include: (1) receiver's name; (2) University department name; (3) room number and building—the building should be the department's official mailing address. You can assist us and the Campus Mail department by using *official building abbreviations* rather than full building names or your own abbreviation in Campus Mail addresses.

ADVICE: Ask Dr. Micro

Q: I bought Typing Tutor III because I wanted to become more proficient on my Mac keyboard. I'm a very slow typist. Sometimes Typing Tutor stops working —although I can restart it. Is my disk bad? What can I do to stop these annoying interruptions?

A: We talked to the Electronics Desk at the Book Center. They told us you're not the only one who's had problems with their Typing Tutor III disk. Others have experienced problems when they type less than 10 or more than 90 words per minute.

We called the 800 phone number in the Typing Tutor book and got an answering service. They referred us to a technical support number at (212) 245-6400. The person we talked to at technical support said he was unfamiliar with the problem, but he'd investigate it and get back to us. Technical support tried to duplicate the failures we described but could not. They suspect the disk is bad and encourage users who experience this problem to return their disks with a note explaining the circumstances under which Typing Tutor failed—or at least to return their disks.

The Book Center does not replace disks. Once you buy software at the Book Center you must follow the vendor's procedures for handling defective products (or for updating products). Simon & Schuster Electronic Publishing (the people who make Typing Tutor III) include *Replacement Order Forms* with Typing Tutor's manual. You can mail your original disk and that replacement form to them. (We suggest you read the Warranty section of their License Agreement.)

We still like Typing Tutor and have not had problems with our lab copy. Stop by the Micro Lab if you want to try it.

Student Programmers Needed

From time to time we receive requests for referrals of student programmers. Typically, these requests come from University faculty and departments who have software projects they need some programmers to complete. We are establishing a data base of University students who are interested in this type of work. If you are interested in being included in this *programmer pool,* visit the Micro HelpLine and fill out our questionnaire. *Note: we do not guarantee that work will be available, only that we will add your name to the pool of student programmers who are interested in work.*

We expect that most of the requests for referrals will come from groups that are working on software as part of Project Woksape, so knowledge of IBM PC equipment and programming languages will be a definite plus. However, if you are interested in programming other microcomputers, you are more than welcome to add your name to the data base.

Woksape News

The University of Minnesota and 18 other schools recently participated in the second Advanced Education Projects (AEP) conference. Each school recently received a grant of IBM equipment to develop experiments to enhance the educational value of computers in an academic environment. Proceedings from last year's conference and Abstracts from this year's conference are available at the Micro HelpLine.

The University of Minnesota will receive $7.5 million in equipment donations over the life of the grant, which runs through August 1988. If you are interested in participating, contact your department head or college computer coordinator.

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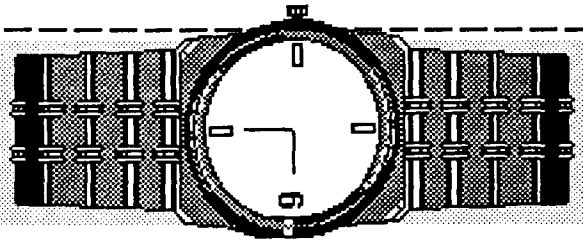

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